

87450RLO

Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Liang-Sheng Liao

FABRICATING AN ELECTRODE
FOR USE IN ORGANIC
ELECTRONIC DEVICES

Serial No. 10/775,360

Group Art Unit: 1792

Confirmation No. 1223

Examiner: Lin, James

Filed 10 February 2005

Commissioner for Patents

P.O. Box 1450

Alexandria, VA. 22313-1450

Sir:

Declaration under 1.132

I, the undersigned, Liang-Sheng (Larry) Liao, of Monroe County, New York, declare that:

I have received B.S. degree in Physics from Jiangxi University, China, and received M.S. degree and Ph.D. degree in Condensed Matter Physics from Nanjing University, China. I have been engaged in research pertaining to Organic Light-Emitting Diode (OLED) technology for 12 years since 1996, focusing particularly on device architectures and performance. I am the coauthor of 82 publications in the open literature. Since I joined Eastman Kodak Company in December 2000, as a co-inventor, I have contributed 23 issued US patents and 30

pending US patent applications in the area of OLED technology; and I am the inventor in the above-captioned patent application.

I have reviewed the outstanding Advisory Action dated 14 October 2008 and any applicable cited references. In addition, I have read the previous Official Action dated 6 August 2008 in this case and have reviewed the references cited therein.

I am a co-inventor of US 2003/0152801 which was cited in the Official Action dated 6 August 2008. In paragraph [0004], I disclosed that when fabricating electrodes made of Mg alloys, it was necessary to use two evaporation sources (boats). While I recognized that using two sources was more complicated than a single source, I was unaware how to make an electrode from a metal alloy using a single source at that time.

In the Advisory Action dated 14 October 2008, the Examiner has stated that 'Although the placement of such materials would have not been effective, there is no suggestion that it would have been inoperable.'

Based on my experience, if Mg and Ag (or Al) are placed into a single boat and heated, the sublimation of Mg starts at about 200° C with no sublimation of the Ag (or Al). To obtain evaporation of the Ag (or Al), the temperature has to be increased to higher than 700° C. However, before reaching that temperature, the Mg metal will be totally consumed by sublimation and distributed all over the place in a vacuum chamber.

Moreover, as is well-known by those skilled in this art, Mg vapor has detrimental effects to the vacuum chamber at this higher temperature. If there is no any adhesion-promoting material being evaporated in the chamber first, Mg vapor will deposit over the entire chamber due to its poor adhesion property, causing 1) severe contamination to all other evaporation sources; 2) severe contamination to the whole vacuum chamber; and 3) Mg deposition onto both sides of sample substrates. The consequence is that not only the samples are destroyed but also the vacuum chamber is no longer usable for making good devices without a thorough cleaning process. No one skilled in this art would ever consider running this experiment.

The vacuum chambers used for the preparation of these devices are expensive and delicate machinery which are difficult to clean properly. Trying to clean the entire chamber from a uniform coating of Mg metal without damage is, at best, time-consuming due to many intricate parts that must be disassembled. The

cleaning process is also prone to cause damage. Even under the best of circumstances, there is always residual Mg left behind that must be baked out. During this time, the machine cannot be used to make devices. Even after the baking is thought to be complete and the machine returned to operation, it is not uncommon for devices to give non-typical results for some period of time which is believed to be due to traces of Mg.

I believe, with reasonable technical certainty, that the use of a single evaporation source for the creation of Mg/Al or Mg/Ag alloys is not only impractical but impossible. It not only destroys the intended target but contaminates the vacuum chambers so heavily that the machine is unusable without a difficult cleaning process and is prone to give unreliable results for a substantial period of time.

I hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

11/04/2008

Date

Liang-Sheng Liao

Liang-Sheng (Larry) Liao